

# The Importance Of Innovative Educational Technologies Used In Teaching Metalworking

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**Received:** 31 August 2025; **Accepted:** 26 September 2025; **Published:** 31 October 2025

**Abstract:** This article highlights the significance of employing modern innovative educational technologies in teaching the topic of manual metalworking. It analyzes the role of interactive methods, problem-based learning, "brainstorming," "cluster," and "small-group work" in developing students' cognitive activity, creative thinking, and practical skills. The paper also substantiates, on a scientific basis, the effectiveness of using learner-centered approaches, information and communication technologies, as well as project and simulation/game-based methods in lesson organization. The research findings show that interactive approaches in metalworking classes play an important role in fostering students' independence, initiative, and technical thinking.

**Keywords:** Innovative educational technologies, interactive methods, problem-based learning, brainstorming, cluster method, small-group work, technological education, metalworking, creative thinking, practical training.

**Introduction:** Each lesson brings new information for the student. In particular, shaping students' knowledge and skills through new instructional material is a key factor in ensuring the quality of education. To deliver new knowledge and develop skills based on it, the use of small-group work, independent creative tasks, practical methods, and similar nontraditional teaching approaches yields good results. Taking these into account, many practical efforts are currently being made to organize the educational process effectively. Since the learner's personality, dignity, and moral development stand at the center of the learning process, every teacher should be able to make this process efficient and engaging. It should be remembered that learner-centered education serves as a driving force in organizing the student's learning activity, bringing to life their interests, wishes, and needs. Learner-centered teaching encompasses increasing the student's engagement, training them to think independently and creatively, ensuring their autonomy and freedom, acting based on their interests, activating their inner potential, directing them to pursue additional learning through their own interests, and fostering self-development.

In interactive instruction, the lesson is carried out on the basis of students' mutual communication. The term "interactive" comes from English, where "inter" means

"mutual" and "act" denotes action, influence, or activity. An interactive method is one that, by increasing the level of activity between the teacher and students, ensures the assimilation of knowledge through their mutual action and influence, and serves to develop personal qualities. Using such methods helps improve the quality and effectiveness of the lesson. Its main criteria include holding informal debates and discussions; presenting learning material freely; independent reading and independent presentation; conducting seminars; creating opportunities for students to take initiative; assigning tasks for work in small groups, large groups, and as a whole class; completing written work; and more. Interactivity—mutual activity, action, and responsiveness—occurs in student–teacher and student–student (subject–subject) dialogues. The primary goal of interactive methods is to create the most favorable environment and conditions for the learning process so as to support the student's active, free, and creative thinking, and to provide opportunities to mobilize their needs, interests, and inner potential.

In the decision of the First President of the Republic of Uzbekistan, I. A. Karimov, dated May 28, 2012, "On measures to further improve the system of training qualified pedagogical personnel and supplying

secondary specialized and vocational education institutions with such personnel,” special attention is paid to training pedagogical staff with modern thinking; to introducing advanced pedagogical methods (case study, project method, cooperative learning, “practical game,” interactive instruction, and others) and information and communication technologies; as well as to establishing the use of electronic learning resources and multimedia presentations in the educational process.

Practice-oriented methods that reinforce skills and competencies are, by their nature, considered innovative.

Problem-based instruction refers to situations created by the teacher during classes and the students’ active, independent activity aimed at solving them. As a result, students acquire professional knowledge and skills, and their thinking abilities develop.

The main goal of the case study is to consolidate knowledge by developing students’ skills in the practical use of conceptual schemes and models in the process of solving various situational problems, including pedagogical ones, as well as by cultivating their abilities in group problem analysis and decision-making.

Students’ active participation (or non-participation) in classes often depends on the teacher. However, any attempt by the teacher to involve students in the lesson may not always be sufficiently effective. Conducting such classes in a problem-based manner increases students’ interest. In this case, for each student to grasp the essence of the lesson, the teacher must pose a specific problem. The degree to which the posed problem awakens motivation in students depends on its character. Each student should deeply understand the purpose of the problem set before them and strive to solve it. Meanwhile, the teacher observes the process, offers appropriate advice, and indicates directions.

A defining feature of modern lessons is precisely this. Managing problem-based teaching requires pedagogical mastery, because the emergence of a problem situation is individual in nature and calls for differentiated and individualized approaches. Another characteristic of problem-based lessons is that, while raising students’ knowledge, this method also sparks their interest in the subject.

There are the following methodological ways to create a problem situation:

- Create contradictions related to the topic and invite students to search for solutions;
- Propose giving different evaluations of the

problem situation;

- Identify problems within theoretical and practical tasks;
- Encourage comparison, generalization, and drawing conclusions;
- Pose precise questions.

The “cluster” method (meaning “bud,” “set,” “bundle”) is a carefully thought-out strategy that can be used in activities organized with students either individually or in groups. Clusters make it possible to synthesize proposed ideas and discover connections among them.

When using this method, the following conditions must be observed:

- Whatever you think of, write it down! Don’t worry about the quality of your ideas—just keep writing!
- Do not pay attention to spelling or other formal aspects of your writing!
- Do not stop writing until the allotted time is up!
- If you cannot think for a while, then start drawing something on the paper!
- Continue this activity until a new idea emerges!

Within a given concept, propose as many new ideas as possible and show the interrelations and connections among them. Using the method, students express their thoughts on the task in the form of clusters (small, separate parts).

“The ‘brainstorming’ method is a technique in which students’ freely expressed ideas and opinions on a given problem are collected, and a certain solution is reached through them. The ‘brainstorming’ method has written and oral forms. In the oral form, each student presents their view orally in response to the question posed by the teacher. Students state their answers clearly and concisely. In the written form, students write their answers to the given question on paper cards briefly and in a way visible to everyone. The answers are attached to the board (using magnets) or to a pinboard (using pins). In the written form of the ‘brainstorming’ method, it is possible to group the answers according to certain criteria. When applied correctly and positively, this method teaches a person to think freely, creatively, and non-standardly.

When the ‘brainstorming’ method is used, there is an opportunity to involve all students; moreover, it cultivates a culture of communication and debate among them. Students develop the skill of expressing their ideas not only orally but also in writing, as well as the ability to think logically and systematically. The fact that the ideas expressed are not evaluated leads to the formation of diverse ideas among students. This

method serves to develop creative thinking.

The stages of the ‘brainstorming’ method are as follows:

1. A question is posed to the students, and they are asked to present their answers (ideas and opinions) regarding this question;
2. Students express their views on the question;
3. Students’ ideas are collected (on a tape recorder, on video, on colored papers, or on the board);
4. The ideas are grouped according to certain criteria;
5. A clear and correct answer to the above question is selected.”

Advantages of the “brainstorming” method:

- Not evaluating the results leads learners to generate a variety of ideas and opinions;
- All learners participate;
- Ideas are visualized as they are produced;
- There is an opportunity to check learners’ prior knowledge;
- It arouses learners’ interest in the topic.

Disadvantages of the “brainstorming” method:

- The instructor may fail to pose the question correctly;
- It requires the instructor to have a high level of listening ability.

The “small-group work” method is a creative classroom activity aimed at studying the learning material or completing a given task by dividing students into small groups to increase their engagement. When this method is used, the learner, working in small groups, has the right to participate actively in the lesson, take on a facilitating/leader role, learn from one another, and value different points of view.

Stages of the “small-group work” method:

1. The direction of activity is determined. Interrelated issues on the topic are specified.
2. Small groups are formed. Students may be divided into groups of 3–6 people.
3. Small groups begin working on the task.
4. The teacher gives clear instructions and provides guidance.
5. Small groups deliver presentations.
6. The completed tasks are discussed and analyzed.
7. The small groups are assessed.

Advantages of the “small-group work” method:

Leads to better mastery of the content;

Helps improve communication skills;

Saves time;

Involves all learners;

Allows for self-assessment and intergroup assessment.

Disadvantages of the “small-group work” method:

Because some small groups may include weaker students, there is a risk that stronger students may also receive lower grades;

It is more difficult to monitor all students;

Negative competition may arise between groups;

Conflicts may occur within a group.

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